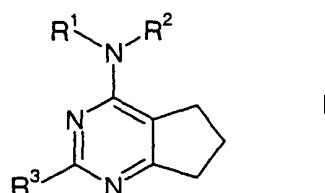


## Patent claims

1. A compound of the formula I,



in which

$R^1$  and  $R^2$ , which are independent of one another and can be identical or different, are hydrogen, or (C<sub>1</sub>-C<sub>8</sub>)-alkyl which can be substituted by one or more identical or different substituents from the group consisting of hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkyl-S(O)<sub>m</sub>, phenyl, naphthyl and pyridyl, or (C<sub>3</sub>-C<sub>9</sub>)-cycloalkyl which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, amino and benzyl, or the radical of a 5-membered to 7-membered saturated heterocyclic ring which contains one or two identical or different hetero ring members from the group consisting of O, NR<sup>10</sup> and S(O)<sub>m</sub> and which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl and aryl-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, where radicals phenyl, naphthyl, pyridyl and benzyl contained in the radicals  $R^1$  or  $R^2$  can be unsubstituted or can be substituted in the aromatic ring by one or more identical or different substituents from the group consisting of halogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, phenyl, CF<sub>3</sub>, NO<sub>2</sub>, OH, -O-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -O-(C<sub>2</sub>-C<sub>4</sub>)-alkyl-O-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>2</sub>)-alkylenedioxy, NH<sub>2</sub>, -NH-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -N((C<sub>1</sub>-C<sub>4</sub>)-alkyl)<sub>2</sub>, -NH-CHO, -NH-CO-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -CN, -CO-NH<sub>2</sub>, -CO-NH-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -CO-N((C<sub>1</sub>-C<sub>4</sub>)-alkyl)<sub>2</sub>, -CO-OH, -CO-O-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -CHO and -CO-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, but where  $R^1$  and  $R^2$  cannot both simultaneously be hydrogen;

or

the radical  $R^1R^2N$  is a radical, bonded via a ring nitrogen atom, of a 5-membered to 7-membered saturated heterocyclic ring which, in addition to the nitrogen atom carrying the radicals  $R^1$  and  $R^2$ , can contain a further hetero ring member from the group consisting of O and S(O)<sub>m</sub> and which can be

substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy and R<sup>11</sup>R<sup>12</sup>N;

R<sup>3</sup> is aryl but cannot be unsubstituted phenyl;

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R<sup>10</sup> is hydrogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, aryl-(C<sub>1</sub>-C<sub>4</sub>)-alkyl-, hydroxy-(C<sub>1</sub>-C<sub>4</sub>)-alkyl-, hydroxycarbonyl-(C<sub>1</sub>-C<sub>4</sub>)-alkyl-, ((C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl)-(C<sub>1</sub>-C<sub>4</sub>)-alkyl-, R<sup>11</sup>R<sup>12</sup>N-CO-(C<sub>1</sub>-C<sub>4</sub>)-alkyl-, R<sup>13</sup>-SO<sub>2</sub>- or aryl;

10 R<sup>11</sup> and R<sup>12</sup> are identical or different radicals from the group consisting of hydrogen and (C<sub>1</sub>-C<sub>4</sub>)-alkyl;

R<sup>13</sup> is (C<sub>1</sub>-C<sub>4</sub>)-alkyl, aryl or R<sup>11</sup>R<sup>12</sup>N;

15 aryl is phenyl, naphthyl or heteroaryl, which can all be substituted by one or more identical or different substituents from the group consisting of halogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, phenyl, CF<sub>3</sub>, NO<sub>2</sub>, OH, -O-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -O-(C<sub>2</sub>-C<sub>4</sub>)-alkyl-O-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>2</sub>)-alkylenedioxy, NH<sub>2</sub>, -NH-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -N((C<sub>1</sub>-C<sub>4</sub>)-alkyl)<sub>2</sub>, -NH-CHO, -NH-CO-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -CN, -CO-NH<sub>2</sub>, -CO-NH-(C<sub>1</sub>-C<sub>4</sub>)-alkyl,  
20 -CO-N((C<sub>1</sub>-C<sub>4</sub>)-alkyl)<sub>2</sub>, -CO-OH, -CO-O-(C<sub>1</sub>-C<sub>4</sub>)-alkyl, -CHO and -CO-(C<sub>1</sub>-C<sub>4</sub>)-alkyl;

heteroaryl is the radical of a monocyclic 5-membered or 6-membered aromatic heterocycle or of a bicyclic 8-membered to 10-membered aromatic heterocycle,  
25 each of which contain one or more identical or different ring heteroatoms from the group consisting of N, O and S;

m is 0, 1 or 2;

30 in all its stereoisomeric forms and mixtures thereof in all ratios, and its physiologically tolerable salts.

2. A compound of the formula I as claimed in claim 1, in which  
one of the radicals R<sup>1</sup> and R<sup>2</sup> is (C<sub>1</sub>-C<sub>8</sub>)-alkyl which can be substituted by one  
35 or more identical or different substituents from the group consisting of hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkyl-S(O)<sub>m</sub>-, unsubstituted or substituted phenyl and

unsubstituted or substituted naphthyl, or is (C<sub>3</sub>-C<sub>9</sub>)-cycloalkyl which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, amino and unsubstituted or substituted benzyl; and the other of the radicals R<sup>1</sup> and R<sup>2</sup> is hydrogen, or (C<sub>1</sub>-C<sub>8</sub>)-alkyl which can be substituted by one or more identical or different substituents from the group consisting of hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkyl-S(O)<sub>m</sub>-, unsubstituted or substituted phenyl and unsubstituted or substituted naphthyl, or is (C<sub>3</sub>-C<sub>9</sub>)-cycloalkyl which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, amino and unsubstituted or substituted benzyl;

or

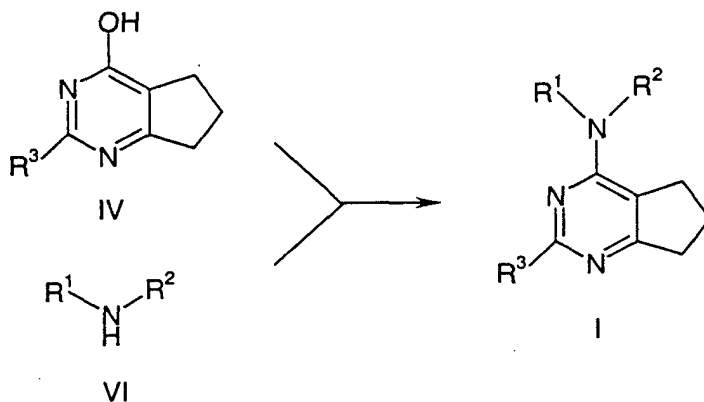
R<sup>1</sup>R<sup>2</sup>N is a radical, bonded via a ring nitrogen atom, of a 5-membered, 6-membered or 7-membered saturated heterocyclic ring which, in addition to the nitrogen atom carrying the radicals R<sup>1</sup> and R<sup>2</sup>, can additionally contain as a further hetero ring member an oxygen atom or a group S(O)<sub>m</sub> and which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy and R<sup>11</sup>R<sup>12</sup>N; in all its stereoisomeric forms and mixtures thereof in all ratios, and its physiologically tolerable salts.

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3. A compound of the formula I as claimed in claim 1 and/or 2, in which one of the radicals R<sup>1</sup> and R<sup>2</sup> is (C<sub>1</sub>-C<sub>4</sub>)-alkyl which can be substituted by one or more identical or different substituents from the group consisting of hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkyl-S(O)<sub>m</sub>-, unsubstituted or substituted phenyl and unsubstituted or substituted naphthyl, or (C<sub>3</sub>-C<sub>9</sub>)-cycloalkyl, which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, amino and unsubstituted or substituted benzyl, and the other of the radicals R<sup>1</sup> and R<sup>2</sup> is hydrogen, or the radicals R<sup>1</sup> and R<sup>2</sup> are identical or different (C<sub>1</sub>-C<sub>4</sub>)-alkyl which can be substituted by one or more identical or different substituents from the group consisting of hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkyl-S(O)<sub>m</sub>-, unsubstituted or substituted phenyl and unsubstituted or substituted naphthyl; in all its stereoisomeric forms and mixtures thereof in all ratios, and its physiologically tolerable salts.

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4. A compound of the formula I as claimed in one or more of claims 1 to 3, in which one of the radicals  $R^1$  and  $R^2$  is (C<sub>3</sub>-C<sub>9</sub>)-cycloalkyl which can be substituted by one or more identical or different substituents from the group consisting of (C<sub>1</sub>-C<sub>4</sub>)-alkyl, hydroxyl, amino and benzyl, and the other of the radicals  $R^1$  and  $R^2$  is hydrogen;
- 5 in all its stereoisomeric forms and mixtures thereof in all ratios, and its physiologically tolerable salts.
5. A compound of the formula I as claimed in claim 1 and/or 2, in which  $R^1R^2N$  is a radical from the group consisting of piperidino, morpholino and thiomorpholino (and its S-oxide and S,S-dioxide); in all its stereoisomeric forms and mixtures thereof in all ratios, and its physiologically tolerable salts.
- 10 6. A compound of the formula I as claimed in one or more of claims 1 to 5, in which  $R^3$  is substituted phenyl; in all its stereoisomeric forms and mixtures thereof in all ratios, and its physiologically tolerable salts.
- 15 7. A process for the preparation of compounds of the formula I as claimed in one or more of claims 1 to 6, which comprises activating a 4-hydroxypyrimidine of the formula IV and then reacting it with an amine of the formula VI,
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where  $R^1$ ,  $R^2$  and  $R^3$  have the meanings indicated in claims 1 to 6.

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8. A compound of the formula I as claimed in one or more of claims 1 to 6 and/or its physiologically tolerable salts for use as a pharmaceutical.

9. A pharmaceutical preparation, which contains one or more compounds of the formula I as claimed in one or more of claims 1 to 6 and/or its/their physiologically tolerable salts and a pharmaceutically tolerable carrier.

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10. A compound of the formula I as claimed in one or more of claims 1 to 6 and/or its physiologically tolerable salts for use as activators of soluble guanylate cyclase.

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11. A compound of the formula I as claimed in one or more of claims 1 to 6 and/or its physiologically tolerable salts for use in the therapy or prophylaxis of cardiovascular disorders, endothelial dysfunction, diastolic dysfunction, atherosclerosis, high blood pressure, angina pectoris, thromboses, restenoses, myocardial infarct, strokes, cardiac insufficiency, pulmonary hypertension, erectile dysfunction, bronchial asthma, chronic renal insufficiency, diabetes or liver cirrhosis or for improving restricted learning capacity or memory power.

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